ARC Technical Resources

Alternative refrigerants training – stationary systems

Alternative refrigerants training in safety awareness and servicing of stationary refrigeration and air conditioning systems is becoming available to technicians across the country.

Low GWP refrigerants have their own unique characteristics and can be flammable and/or toxic, or have to operate at extreme pressures. To meet Work Health and Safety obligations and ensure the equipment is safe, existing refrigeration and air conditioning workers require further training to safely handle the alternative refrigerants before they install, commission, service and repair stationary refrigeration and air conditioning systems that use a natural or flammable synthetic refrigerant.

Listed below are the updated national alternative refrigerant competency standard units available either as gap training for existing workers or as electives in the Certificate III in Refrigeration and Air Conditioning trade qualification: Note: These units replaced the previous units shown in brackets below in October 2020.

Flammable Refrigerants

UEERA0007 (previously UEENEEJ174A) Apply safety awareness and legal requirements for flammable refrigerants.
This unit involves the skills and knowledge required to apply safety awareness and legislative requirements for Class A2, A2L and A3 flammable refrigerants. It includes applying safety and relevant legislation to safely handle and store flammable refrigerants.

UEERA0084 (previously UEENEEJ175A) Service and repair self-contained flammable refrigerant air conditioning and refrigeration systems.
This unit covers specialised procedures for servicing and repairing self-contained air conditioning and refrigeration equipment using Class A2, A2L and A3 flammable refrigerant.

It includes servicing and repairing self-contained air conditioning and refrigeration equipment using flammable refrigerant. It also includes working safely; applying refrigeration principles that apply to flammable refrigerant; following service manuals; testing, locating and rectifying faults and defective components; and completing necessary service documentation.

UEERA0048 (previously UEENEEJ176A) Install and commission flammable refrigerant air conditioning and refrigeration systems

This unit involves the skills and knowledge required to install and commission Class A2, A2L and A3 flammable refrigerant air conditioning and refrigeration systems, components and associated equipment in accordance with legislative, standard and code requirements.

It includes working safely and installing equipment, components and piping to job specifications. It also includes completing pre-commissioning tests, starting the system, ensuring correct refrigerant charge, adjusting components and controls to efficient operation, completing installation and commissioning documentation.
VU22583 - Handle Class A2/A2L Flammable Refrigerants

This unit of competency describes the, skills and knowledge required to safely handle, use, store and transport A2/A2L classified flammable refrigerants for example R32 and R1234yf. The unit includes working safely; complying with relevant legislative, regulatory/licensing, standards and codes requirements; relevant performance characteristics; manufacturers' recommendations/ instructions and industry practices; and completing the necessary documentation.

Carbon Dioxide refrigerant.

UEERA0006 (previously UEENEEJ184A) Apply safety awareness and legal requirements for carbon dioxide refrigerant.

This unit involves the skills and knowledge required to apply safety awareness and legal requirements for carbon dioxide (CO^2) refrigerant.

It includes applying safety and legal requirements when handling, using and storing CO^2 refrigerants.

The skills and knowledge in this unit will be applied by those managing, supervising or working in or near a location that contains refrigeration equipment using CO^2 refrigerant. These could include managers, supervisors, maintenance staff, cleaners, employees and refrigeration and air conditioning technicians

UEERA0066 (previously UEENEEJ185A) Repair and service carbon dioxide refrigeration systems.

This unit involves the skills and knowledge required to repair and service carbon dioxide (CO^2) refrigeration system.

It includes servicing and repairing refrigeration equipment using CO^2 as a refrigerant excluding self-contained trans-critical systems. It also includes applying safe working practices and refrigeration principles that apply to CO^2; following service manuals; testing, locating and rectifying faults and defective components; and completing the necessary service documentation.

UEERA0068 (previously UEENEEJ188A) Repair and service self-contained carbon dioxide refrigeration and heat pump systems.

This unit involves the skills and knowledge required to repair and service self-contained carbon dioxide (CO^2) refrigeration and heat pump system.

It includes specialised procedures for servicing and repairing of self-contained refrigeration and heat pump equipment using CO^2 as a refrigerant. It also includes applying safe working practices and refrigeration principles that apply to CO^2; following service manuals; testing, locating and rectifying faults and defective components; and completing the necessary service documentation.

UEERA0047 (previously UEENEEj186A) Install and commission carbon dioxide refrigeration systems, components and associated equipment

This unit involves the skills and knowledge required to install and commission carbon dioxide (CO^2) refrigeration system, components and associated equipment.

It includes installing and commissioning refrigeration equipment using CO^2 as a refrigerant excluding self-contained trans-critical systems. It also includes applying safe working practice and refrigeration principles that apply to CO^2, following design specifications; testing, locating and rectifying faults and defective components; and completing the necessary installation and commissioning documentation.

Ammonia

UEERA0005 (previously UEENEEJ178A) Apply safety awareness and legal requirements for ammonia refrigerant.

This unit involves the skills and knowledge required to apply safety awareness and regulatory and industry standard requirements for ammonia refrigerant.

It includes safety and legal requirements when handling, using and storing ammonia refrigerant.

UEERA0065 (previously UEENEEJ179A) Repair and service ammonia refrigeration systems.

This unit involves the skills and knowledge required to repair and service ammonia refrigeration systems.

It includes servicing and repairing refrigeration equipment using ammonia as the refrigerant. It also includes applying safe working practice and refrigeration principles that apply to ammonia; following service manuals; testing, locating and rectifying faults and defective components, and completing necessary service documentation.

UEERA0057 (previously UEENEEJ196A) Operate Ammonia Refrigeration Plant

This unit involves the skills and knowledge required to operate ammonia (R717) refrigerant refrigeration plants.

It includes operating an industrial refrigeration plant using ammonia as the refrigerant. It also includes applying specialised refrigeration principles that apply to ammonia, specifying the normal operating parameters for the plant, rectifying faults and defective components within organisational guidelines, and completing the necessary service documentation.

UEERA0046 (previously UEENEEJ180A) Install and commission ammonia refrigeration systems, components and associated equipment

This unit involves the skills and knowledge required to install and commission ammonia refrigeration system, components and associated equipment.

It includes installing and commissioning refrigeration equipment using ammonia as the refrigerant. It also includes applying safe working practices and refrigeration principles that apply to ammonia, interpreting plans and specifications, commissioning and completing the necessary commissioning documentation.

Training in these units is now available through over 30 registered training organisations (RTO) across the country who have been approved to deliver these units by the Australian Skills Quality Authority.

You can view the units and search for an RTO at https://training.gov.au/
Enter the unit code, for example UEERA0007, in the Nationally recognised training box and press 'Search'. Click on 'Find RTOs approved to deliver this unit of competency' and a list of training organisations approved to deliver the unit will be provided with their contact details.

Links to relevant resources:

- **AIRAH's Online Flammable Refrigerant Safety Guide resources**, which were updated in 2018 and are available for free at: https://www.airah.org.au/frsg
  These resources include the Flammable Refrigerant Safety Guide, Fact Sheets and 8 module videos covering:
  Module 1: About Flammable Refrigerants
  Module 2: Managing Refrigerant Flammability Risk
  Module 3: Hazardous Areas and Temporary Flammable Zones
  Module 4: Design Rules for flammable refrigerants
  Module 5: Installation rules for flammable refrigerants
  Module 6: System conversion rules
  Module 7: Maintenance with flammable refrigerants
  Module 8: Handling flammable refrigerants

- **HVACR Nation article – Where to Flare**
  The use of low-flammability refrigerants such as R32 in common air conditioning equipment is necessary if the HVAC&R industry is to successfully meet its obligations for the HFC phase-down under

the Montreal Protocol. But there has been some confusion as to whether flare joints are allowed for connection indoors.
This HVAC&R Nation sets the record straight and available at:
https://www.airah.org.au/Content_Files/HVACRNation/2018/02-18-HVAC-002.pdf

- **Heads of Workplace Safety Authorities (HWSA) Flammable Refrigerants Position Paper**
  Available at: https://www.safework.nsw.gov.au/resource-library/hazardous-chemicals/flammable-refrigerant-gases-position-paper

- **REAL Alternatives e-learning resources,** available for free at: http://ucllenergy.be/real2/index.php

  This is a European learning programme for technicians working in the refrigeration, air conditioning and heat pump sector designed to improve skills and knowledge in safety, efficiency, reliability and containment of alternative refrigerants. The programme provides a mix of interactive e-learning, printed training guides, tools, assessments for use by training providers and an e-library of additional resources signposted by users. The e-learning programme consists of the following modules:

  - Introduction to Alternative Refrigerants - safety, efficiency, reliability and good practice
  - Safety and risk management
  - System design using alternative refrigerants
  - Containment and leak detection of alternative refrigerants
  - Maintenance and repair of alternative refrigerant systems
  - Retrofitting with low GWP refrigerants
  - Checklist of legal obligations when working with alternative refrigerants
  - Measuring the financial and environmental impact of leakage
  - Tools and guidance for conducting site surveys

- **United Nations: Good Servicing Practices for Flammable Refrigerants App. a**vailable for free at:
  https://wedocs.unep.org/bitstream/handle/20.500.11822/27136/8017Smartapp2.pdf?sequence=1&isAllowed=y

  This user-friendly application includes a refrigerant charge size calculator and a room size calculator for flammable refrigerants based on ISO 5149.

- **Australian Refrigeration Council's Green Scheme Accreditation program**

  To provide an easily accessible record of the accredited training gained by RAC Technicians on these alternative refrigerants, ARC has established a Green Scheme Accreditation program. It provides a pathway for refrigeration and air conditioning technicians to upskill, and facilitates the use of new and emerging refrigerants and technologies into the industry. It is voluntary, and incorporates key refrigerants not covered by the ARCtick scheme. Specifically, hydrocarbons, C02 (R744), Ammonia and HFO 1234yf. For more details refer to the attached flyer and our website at:
  https://www.arcltd.org.au/green-scheme-accreditation/